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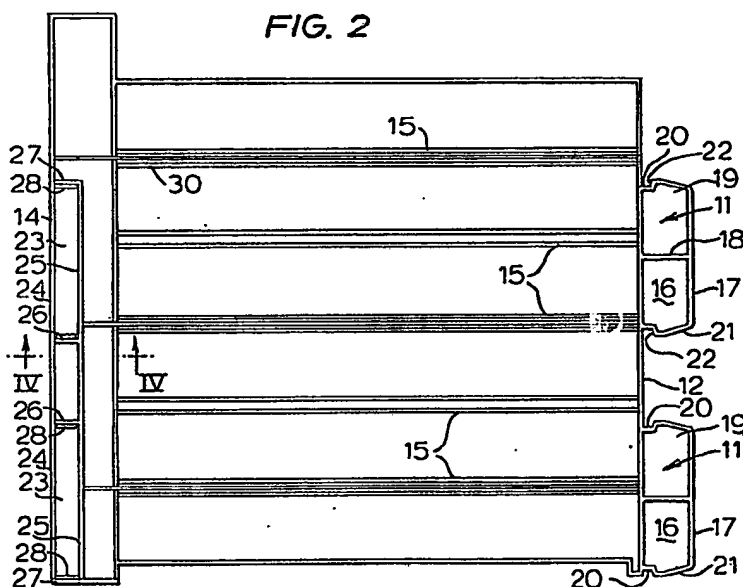
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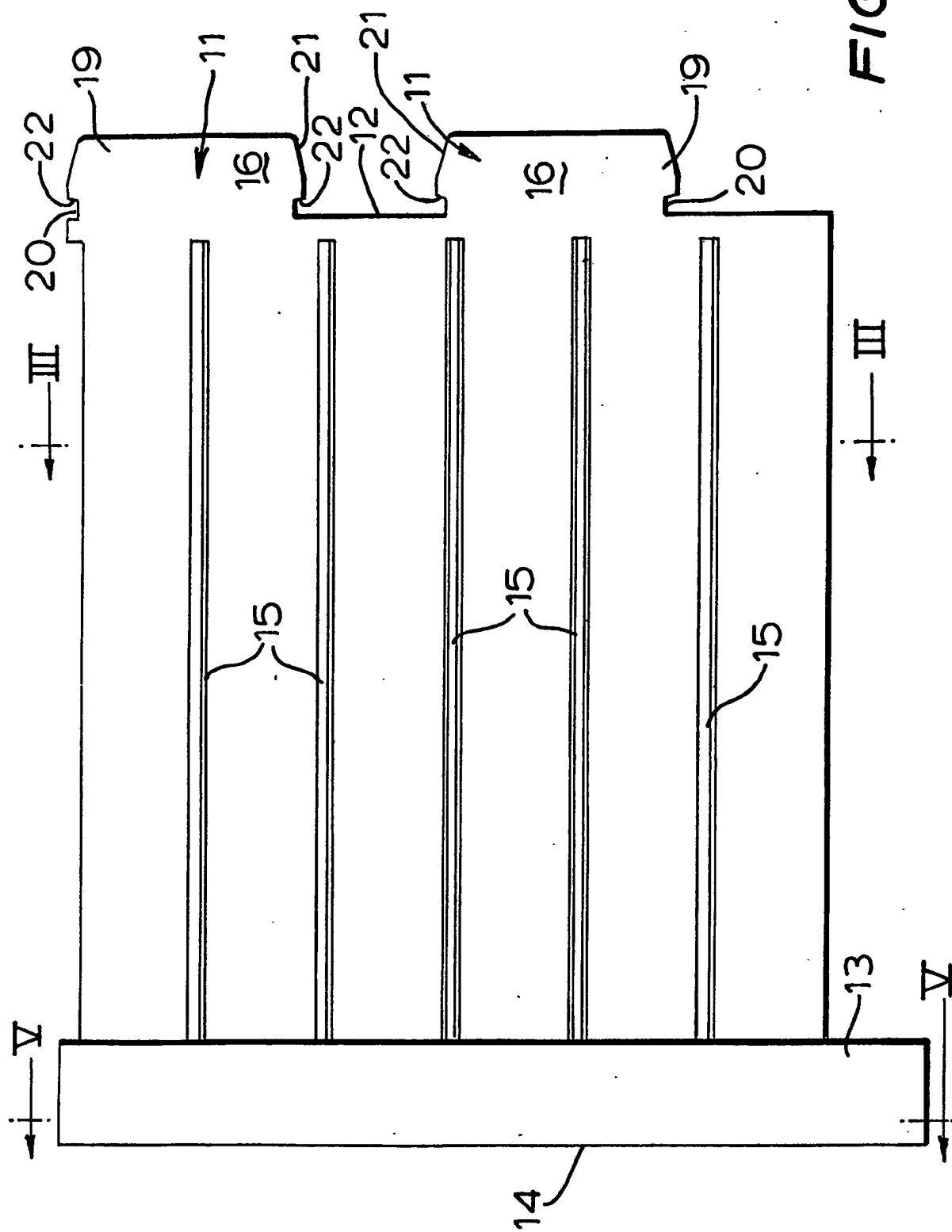
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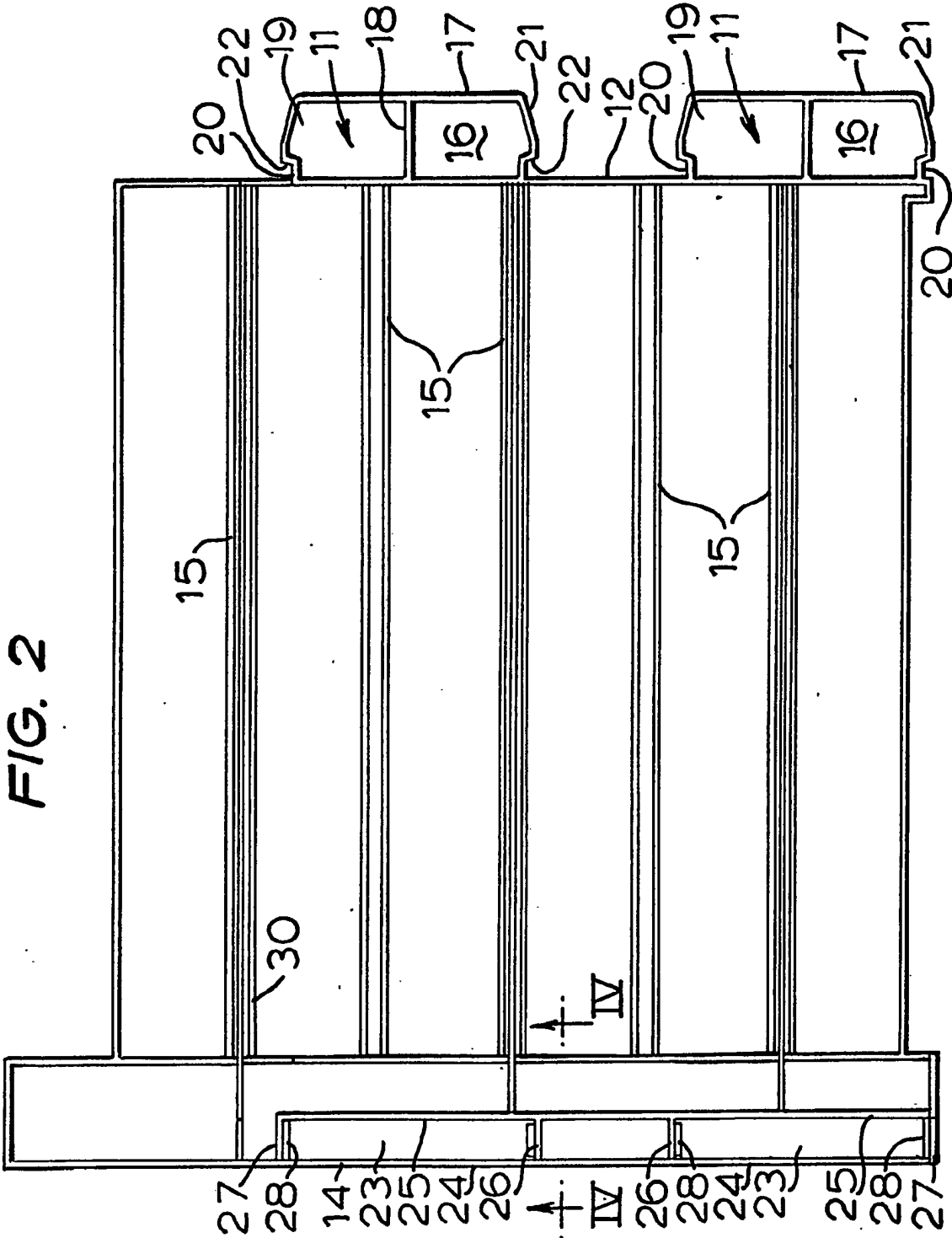
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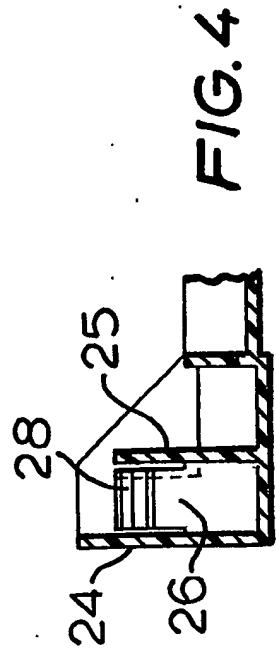
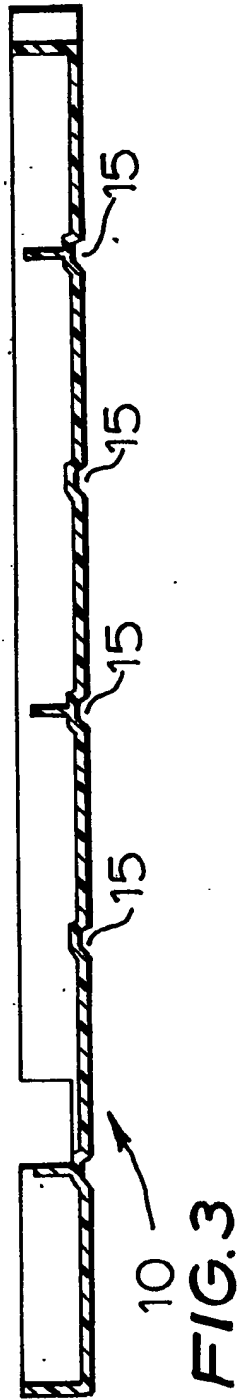
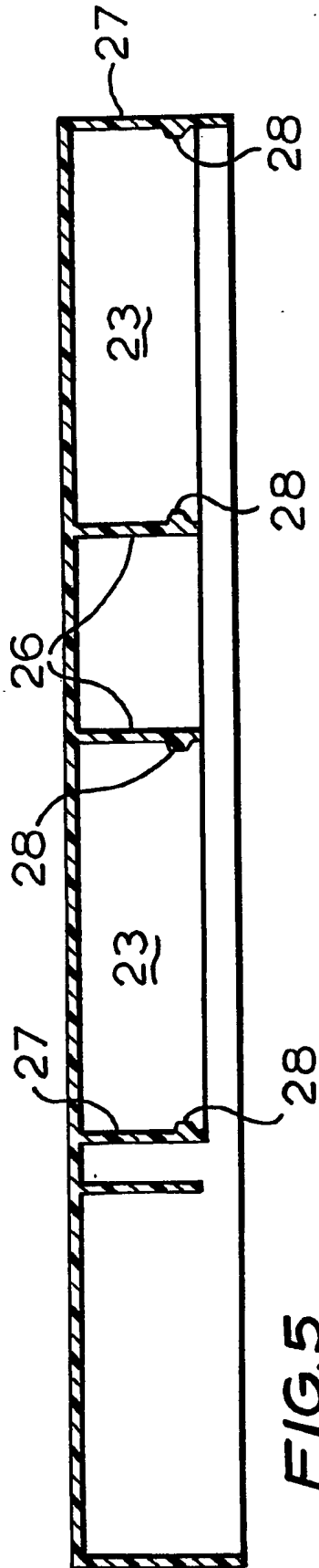
(64) Connecting means for container wall panels

(67) A panel, suitable for interlocking with another like panel such that a container may be assembled from four like panels and a base wall, has two lugs 11 projecting in the plane of the panel from one edge and two recesses 23 formed along the opposed edge, to receive the lugs of another panel. Each lug has a head portion 19 joined to the remainder of the panel by a neck portion 20, a lead being provided on the head portion at 21. Each recess is defined by a flange 24 extending along edge 14 of the panel, a second wall 25 upstanding parallel to flange 24 but spaced inwardly of the panel, and two further walls 26 and 27, each provided with an inwardly directed projection 28 to engage behind the head of a lug. Each further wall 26 and 27 is partially separate from flange 24 and wall 25, to allow springing movement thereof upon insertion of a lug of one panel into a recess of a further panel.









SPECIFICATION

A panel connection

5 This invention relates to means to effect a connection between two moulded plastics panels for use in the construction of a plastics article. In particular - but not exclusively - the invention concerns the interconnection of four similar panels at their
10 opposed edges so as to make a rectangular container.

Small plastics articles can with relative ease be moulded in one piece, for example by injection moulding, vacuum forming or blow moulding techniques. However, when a relatively large container is to be made, it may be more economic to make the container out of several, smaller pieces appropriately connected together. This has advantages not only from the manufacturing point of view - in that there
20 is likely to be a reduction in the capital cost of the manufacturing equipment, the cost of the moulds and so on - but also from storage, packing and transport considerations. This is because the articles can be stored, packed and transported in their
25 "knocked-down" form - i.e. in their unassembled state.

When a moulded plastics article is to be assembled from a plurality of individual panels, it is obviously advantageous for the technique employed
30 to join together the panels to be simple to implement. This is especially so where the article is to be transported and sold in its knocked-down state, for assembly by the ultimate user, where the use of heat or chemical bonding techniques would be inappropriate. In the case of a rectangular container, there have been designed various snap-in connections, mostly being variations on the principle of a lug on one panel which may be snapped through an aperture in the other panel. Such panel-joining
40 techniques tend however to be somewhat obtrusive in the finished article, and spoil the overall external shape and lines of the article. It is therefore a principal object of this invention to provide connection means for two panels suitable for use for
45 example in the construction of a container which connection means permit the rapid and facile interconnection of two panels, and which nevertheless may be concealed internally of the finished article so as not to spoil the external appearance thereof.

50 According to this invention, there is provided means for forming a connection between two moulded plastics panels for use in the construction of a plastics article, which connection means comprises, on a first panel, at least one lug projecting in
55 the plane of the panel from an edge thereof which is to lie adjacent an edge of the other panel the shape of the or each lug considered in the plane of the panel defining a head portion joined to the panel by a neck portion, and the other panel having a number
60 of recesses disposed along the said edge of the other panel but wholly within the confines of that panel, there being one recess respectively for each lug on the first panel and positioned such that when the lugs and recesses are interconnected the panels
65 have the required relative disposition, the or each

recess being provided wholly within the perimeter of the other panel and being defined by a first wall in the form of an upstanding flange along the said edge of the panel, a second upstanding wall spaced
70 inwardly of the panel from the first wall by a distance substantially equal to the thickness of the lug, and third and fourth spaced upstanding walls extending between the first and second walls, each of the third and fourth walls having projections directed inward-
75 ly of the recess to engage behind the head of a lug driven into the recess and at least one of the third and fourth walls being at least partially separate from both the first and second walls thereby to allow resilient deformation of that wall so as to permit
80 acceptance of the head portion of a lug into the recess.

It will be appreciated that the connection means of this invention permits the rapid and easy assembly together of two panels incorporating the connection
85 means; all that is necessary is for the or each lug on one panel to be aligned with the or each recess on the other panel, and then the lugs are driven into the recesses, thereby completing the connection. Once done, and provided that each recess has a sufficient
90 depth to accommodate the length of the associated lug, the connection cannot be seen externally of the panels. The edge of the first panel which is provided with the or each lug lies closely adjacent the edge of the second panel which has the recesses, and thus
95 the finished article including the two panels may have a particularly neat and aesthetically-pleasing appearance. Moreover, because the connection is a derivative of the "snap" type, and because a lug is contained wholly within a recess, a secure and rigid
100 connection between the two panels is obtained.

Most preferably, each lug is given a "lead" to facilitate the entry of the lug into its recess. Such a lead may be provided by forming a chamfer on the head portion in the region of the free end thereof,
105 where the lug engages the third and fourth walls. However, a relatively fine chamfer may also be provided across the width of the lug, to facilitate the entry thereof between the first and second walls of the recess.

110 In a preferred embodiment of this invention, each panel is substantially rectangular in overall shape, and has at least one lug, but preferably two lugs, formed on one edge of the panel, and on the opposite parallel edge, has a like number of similarly
115 positioned recesses. Four identical panels may thus be used in the construction of a rectangular article. The finished article may for instance be a container, in which case the article may be completed by providing a base wall, fitted within the assembled
120 four panels. For such an article, each panel may include a single leg positioned to project in the plane of the panel parallel to the edge thereof which is provided with the recesses, whereby the assembled container may have four supporting legs.

125 Most conveniently, panels incorporating the connecting means of this invention are manufactured by an injection moulding technique, from a thermoplastics material such as polypropylene. The major wall area of each panel may thus be relatively thin,
130 reinforced as necessary by means of ribs extending

thereacross, which ribs may appropriately be positioned and shaped so as to add to the appearance of the finished article. For example, each panel may be ribbed in such a way as to simulate wooden slats.

- 5 Each lug may be defined by a flange extending around the main area of the lug, which itself is defined by an extension of the major area of the panel, the flange being reinforced as appropriate by one or more internal bracing walls. Similarly, the major area of the panel may have a flange there-
10 around, which flange may then define the first wall of the or each recess, the second, third and fourth walls of each recess being moulded integrally with the panel in the injection moulding process, so as to
15 upstand from the major area of the panel, in the same sense as the flange itself upstands along the edge of the panel.

By way of example only, one specific embodiment of connection means according to this invention will
20 now be described in detail, reference being made to the accompanying drawings which show a single panel suitable for use with three other identical panels in the construction of a container. In the drawings:

- 25 *Figure 1* is an 'outside' side view of the panel incorporating the connection means of this invention;

Figure 2 is an 'inside' side view of the panel of *Figure 1*;

- 30 *Figure 3* is a cross-sectional view taken on line III-III marked on *Figure 1*;

Figure 4 is a part sectional view taken on line IV-IV marked on *Figure 2*; and

- 35 *Figure 5* is a sectional view taken on line V-V marked on *Figure 1*.

Referring to the drawings, and *Figure 1* in particular, it can be seen that the panel there-shown is of generally rectangular overall shape, but includes two lugs 11 projecting from one edge 12 of the
40 panel, and a leg 13 projecting parallel to an edge 14 opposed to the edge 12. Extending between the edges 12 and 14 are ribs 15, formed in the panel both to strengthen the major area thereof, and to give the panel an aesthetically-pleasing appearance.

- 45 Four identical panels 10 are used in the construction of a rectangular container, the four panels being snapped together by means of the lugs 11 on each panel being engaged with recesses formed along edge 14 of the next adjacent panel. When thus
50 assembled, the face illustrated in *Figure 1* of each panel is directed outwardly of the container and hence this face can be regarded as the 'outside' face; *Figure 2* shows the side of the panel which is directed inwardly of the container - i.e. the 'inside'
55 face.

Each lug 11 is defined by an extension 16 of the major area of the panel 10, an upstanding flange 17 being provided around the periphery of the extension 16, with an internal reinforcing wall 18 being
60 disposed to run along the length of the lug. Each lug 11 is thus hollow, and open on one face.

The shape of the extension 16 is such that the lug has a major head portion 19 joined to the panel 10 by means of a neck portion 20. The head portion 19
65 tapers towards its free end, as shown at 21, and

between the head portion 19 and neck portion 20 there are abutment faces 22, on both sides of the lug 11.

- As mentioned above, there are two recesses
70 formed along edge 14 but within the confines of the panel. The recesses are shown at 23 and are suitably disposed to receive the lugs 11. Each recess 23 is defined by a first wall constituted by a flange 24 extending along the edge 14 of the panel 10 (which
75 flange continues around the whole of the panel, as shown in *Figure 2*), and by a second wall 25 upstanding from the panel parallel to but spaced inwardly from the flange 24. The spacing between the flange 24 and second wall 25 is substantially
80 equal to the thickness of each lug 11 - that is to say, the dimension of the lug measured over the flange 17 and extension 16 thereof. Each recess 23 is further defined by third and fourth walls 26 and 27 extend-
85 ing between the flange 24 and the second wall 25, and the spacing of the third and fourth walls is slightly less than the greatest dimension across the head portion 19 of each lug 11. Each of the third and fourth walls has a projection 28 adjacent its free end and directed inwardly of the recess. The third walls
90 26 of the two recesses 23 are separate from the flange 24 and second wall 25 for substantially the whole of the length of the third wall 26, as shown in *Figure 4*, such that the third wall 26 is free to deform resiliently towards and away from its associated
95 fourth wall 27.

Four panels as have been described above are assembled together by engaging the lugs 11 on one panel in the recesses 23 of another panel, such that when the lugs 11 are fully home within the recesses
100 23, each panel is held securely to the next adjacent panel, at right angles thereto. In this state, edge 12 of one panel is closely adjacent edge 14 of the next adjacent panel, and hence the connection between the two panels is not visible externally of the two
105 panels, and is barely discernable internally.

The connection thus effected is of "snap" kind, in that the insertion of the lugs 11 into the recesses 23 causes deformation of the third walls 26. As the insertion is completed, the projections 28 are able to
110 engage behind the abutment faces 22 on the lugs 11, and in view of the relatively sharp angle of the abutment faces 22 and the projections 28, removal of the lugs can be effected only by exerting considerable force on the two panels. By contrast, the
115 insertion of a lug into a recess is relatively easy, in view of the taper provided at the front of the head portion 19 of each lug.

A container may be completed from the assembled four panels by fitting a base wall therewithin, so as to lie for example adjacent rib 30 provided in each panel. Such a base wall may be fitted either after the four panels have been assembled together to form a rectangular enclosure, or may be fitted during that assembly, for greater security.

125 CLAIMS

1. Means for forming a connection between two moulded plastics panels for use in the construction
130 of a plastics article, which connection means com-

prises, on a first panel, at least one lug projecting in the plane of the panel from an edge thereof which is to lie adjacent an edge of the other panel, the shape of the or each lug considered in the plane of the

5 panel defining a head portion joined to the panel by a neck portion, and the other panel having a number of recesses disposed along the said edge of the other panel but wholly within the confines of that panel, there being one recess respectively for each lug on

10 the first panel and positioned such that when the lugs and recesses are interconnected the panels have the required relative disposition, the or each recess being provided wholly within the perimeter of the other panel and being defined by a first wall in

15 the form of an upstanding flange along the said edge of the panel, a second upstanding wall spaced inwardly of the panel from the first wall by a distance substantially equal to the thickness of the lug, and third and fourth spaced upstanding walls extending

20 between the first and second walls, each of the third and fourth walls having projections directed inwardly of the recess to engage behind the head of a lug driven into the recess and at least one of the third and fourth walls being at least partially separate

25 from both the first and second walls thereby to allow resilient deformation of that wall to as to permit acceptance of the head portion of a lug into the recess.

2. Connection means according to claim 1, wherein each lug is given a lead to facilitate the entry of the lug into its recess.

3. Connection means according to claim 1, wherein the lead is provided by forming a chamfer on the head portion in the region of the free end thereof, where the lug engages the third and fourth walls on completing the connection.

4. Connection means according to claim 2 or claim 3, wherein a relatively fine chamfer is provided across the width of the lug, to facilitate the entry thereof between the first and second walls of the recess.

5. Connection means substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

45 6. A panel for use in forming a connection embodying means according to any of the preceding claims, wherein each panel is substantially rectangular in overall shape, and has at least one lug, but preferably two lugs, formed on one edge of the

50 panel, and on the opposite parallel edge, has a like number of similarly positioned recesses.

7. A panel according to claim 6, wherein the panel is manufactured by an injection moulding technique using a thermo-plastics material.

55 8. A panel according to claim 7, wherein the major wall area of each panel is relatively thin, reinforced as appropriate by means of ribs extending thereacross.

9. A panel according to any of claims 6 to 8, wherein each lug is by a flange extending around the main area of the lug, which lug is itself defined by an extension of the major area of the panel, the flange being reinforced as appropriate by one or more internal bracing walls.

65 10. A panel according to claim 9, wherein the

major area of the panel has a flange therearound, which flange defines the first wall of the or each recess, the second, third and fourth walls of each recess being moulded integrally with the panel so as

70 to upstand from the major area of the panel in the same sense as does the flange.

11. A panel for use in constructing a container, substantially as hereinbefore described with reference to and as illustrated in the accompanying

75 drawings.

12. A container constructed from four panels according to any of claims 6 to 11, and connected together at their opposed edges, in combination with a base wall fitted within the four panels

80 assembled together.

13. A container according to claim 12, wherein each panel includes a single leg positioned to project in the plane of the panel parallel to the edge thereof which is provided with the recesses, whereby the

85 assembled container may have four supporting legs.

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